# DUST-HAZARD INDUSTRIAL EMPLOYEES: A CLINICAL AND PATHOGENETIC SUBSTANTIATION FOR PERIODONTAL DISEASE PREVENTION AND TREATMENT

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**Abstact**: The effects of industrial dust on the health of periodontal tissues are among the topics covered in this article, which details the findings of a functional and clinical evaluation of employees in dust-hazardous occupations (utilizing cement plants as an example). Take aim. In order to enhance the prevention and optimize the comprehensive treatment of chronic generalized periodontitis in workers who are exposed to dust, it is necessary to do a thorough examination of their periodontal health. The methodology. There was a periodontal status evaluation in a control group and a core group of 120 employees (aged 18–44 with more than three years of experience). Lab testing (immunity and inflammatory markers), cytological examinations, and functional methods (Laser Doppler Flowmetry) were all part of the study. The indices used included OHI-S, PMA, GI, and CPITN. Final product. Cement factory employees showed pathogenetic signs of periodontal disease due to mineral dust's mechanical and fibrogenic impacts. We found that alterations in local immunity and impairments in gingival microcirculation were associated with duration of work. Final thoughts. The results prove that a specialized strategy is needed for the dental rehabilitation of employees who are exposed to dust-related variables. The efficacy of periodontitis treatment and prevention is greatly improved by incorporating these measures.

**Keywords**: Dental problems, cement manufacturing, industrial dust, preventive, Laser Doppler Flowmetry,

**Introduction**: Because of its high incidence among people of working age, periodontal diseases continue to be a major concern in contemporary dentistry. Industrial dust is a continual occupational issue for a high-risk group of workers in the Republic of Uzbekistan, including those in the cement, asbestos, and wheat milling plants.

Dust from industrial sources is very irritating, fibrogenic, and mechanical. When it gets inside the mouth, it rips the mucosa to tiny tears, stops blood flow to the area, and makes tissue damage worse, all of which lead to chronic inflammation. The special challenges of prevention and rehabilitation for this group of workers, taking into consideration the pathogenetic impact of dust, have not been adequately investigated, despite medical progress; thus, new methods are required.

**Literature review :** With severe forms impacting anywhere from 20% to 50% of the global population, periodontal diseases continue to be a major obstacle in global public health. Periodontal pathology affects 81% to 92% of the population in underdeveloped nations like Uzbekistan, according to the World Health Organization (WHO). There has been a recent uptick in the incidence of aggressive, fast-advancing periodontitis in working-age adults, which is associated with social maladaptation and early tooth loss.

There has been a lot of study on how industrial settings affect people's oral health. One of the main causes of chronic inflammation in the mouth is occupational risks, especially industrial dust. The health of a country's working population is a good barometer of its social and economic stability, according to research by Rizaev J.A. (2008) and others. However, dental morbidity among industrial workers has spiked due to the closure of on-site dental clinics and a decrease in frequent

preventative screenings during the past twenty years. The periodontium is affected in a multi-pronged manner by industrial dust, which includes cement, mineral, and fibrogenic dust: Periodontal infections are able to enter the gums more easily due to mechanical irritation caused by fine particulate matter, which creates micro-abrasions on the gingival margin. The alkaline nature and high absorption capacity of cement dust cause the oral mucosa to become dehydrated, which is known as the hygroscopic effect. Saliva loses some of its protective characteristics and changes in consistency as a result. Disorders of the Microcirculation: Ongoing contact with mineral dust causes chronic ischemia. Modern studies employing Laser Doppler Flowmetry (LDF) have demonstrated that, as a function of seniority, the capillary blood flow of workers in dust-hazardous industries is substantially reduced. Biological Change: Studies point to an immunological response that is both systemic and local, with secretory immunoglobulin A (sIgA) levels falling and pro-inflammatory cytokines rising. This leads to a "vicious cycle" of inflammation and tissue damage. The shift from reactive treatment to proactive prevention is a current focus in dentistry practice. The diagnosis of "pre-clinical" stages of illness is made possible through the integration of objective diagnostic instruments like the Community Periodontal Index of Treatment Needs (CPITN) with functional assessments like LDF. Experts contend that industrial workers frequently need a tailored strategy to periodontal treatment since conventional methods are inadequate. To counteract the unique mechanical and chemical impacts of industrial dust, some people utilize local antioxidants, others use microcirculation stimulants, and still others follow particular protocols for mouth cleanliness.

While there is a plethora of information on periodontology in general, there is a severe dearth of studies that target Central Asian cement industry employees in particular. There needs to be further investigation into the clinico-pathogenetic support for individualized preventative programs to protect the oral health of

employees in dust-hazardous jobs to fill this knowledge gap.

**Materials and Methods:**

The study's main group consisted of 120 cement factory employees, ranging in age from 18 to 44, all of whom had been exposed to dust on the job for at least three years. People who were not exposed to any work dangers but were of the same age and gender made up the control group.

To determine periodontal health, the following procedures were employed: The PMA, GI (Löe-Silness), CPITN, and OHI-S indices are clinical and instrumental variables.

Second, functionally, we can assess gum capillary blood flow using laser doppler flowmetry (LDF).

Analyzing inflammatory markers and measures of local and systemic immunity in a laboratory setting.

Fourth, cytology involves looking at samples taken from the space between the gums and the tooth.

**Results Of the research**

A high frequency of inflammatory periodontal diseases was found during the clinical evaluation of the primary group. Dental calculus and periodontal pockets that were four to five millimeters deep were the most common findings in the CPITN index structure.

It is worth mentioning the functional research outcomes in particular. Workers with over five years of experience had a significantly lower microcirculation index according to LDF data, suggesting the onset of chronic tissue ischemia caused by the fibrogenic dust factor. The presence of epithelial

desquamation and substantial leukocyte infiltration was observed in the cytological profile of the gingival sulcus smears, which confirmed the presence of an active clinical process.

The alkaline reaction and hygroscopicity of the mineral dust used to make cement contribute to the drying out of the mucosa and changes the makeup of the gingival fluid, which in turn reduces the local immune response. Evidence from the lab backs this up: employees in the control group had higher levels of pro-inflammatory cytokines and lower secretory IgA levels.

## Conclusion

Workers in occupations where dust is a common hazard often suffer from severe periodontal tissue damage, which is correlated with both the type of dust they work with and their length of time on the job. Mechanical tissue injury and microcirculation abnormalities are the pathogenetic basis of the damage, as demonstrated by LDF techniques. Third, industrial workers receive better dental care when a differentiated preventative program is put into place. This program includes early detection of functional issues and the application of therapies that are based on pathogens. The study's findings provide credence to the idea that dental exams should be part of the routine health screenings offered by businesses in the cement sector.

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